

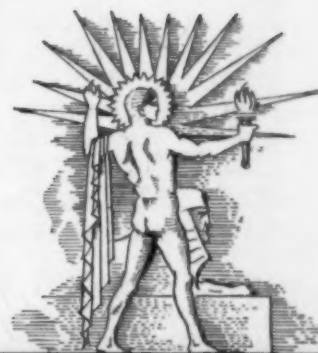
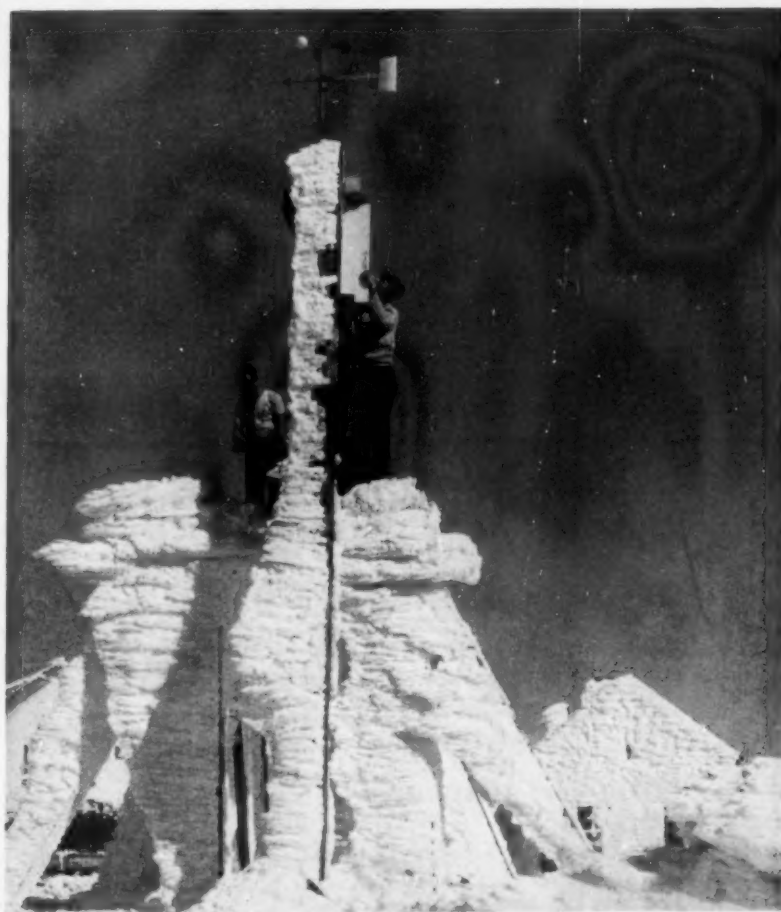
PRICE  
15¢

PERIODICAL ROOM  
GENERAL LIBRARY  
UNIV. OF MICH.

APR 11 1933

# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



APRIL 8, 1933

Cold Pole of the United States

See Page 223

A

SCIENCE SERVICE PUBLICATION

## SCIENCE NEWS LETTER

VOL. XXIII

No. 626

The Weekly  
Summary of  Current  
Science

Published by

## SCIENCE SERVICE

The Institution for the Popularization of Science organized under the auspices of the National Academy of Sciences, the National Research Council and the American Association for the Advancement of Science.

Edited by WATSON DAVIS

Subscription rates—\$5.00 a year postpaid; two years \$7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

In requesting change of address, please give old as well as new address.

Advertising rates furnished on application.

## Board of Trustees of Science Service

*Honorary President.* William E. Ritter, University of California. Representing the American Association for the Advancement of Science, J. McKeen Cattell, *President*, Editor, Science, Garrison, N. Y.; Burton E. Livingston, Johns Hopkins University, Baltimore, Md.; Raymond Pearl, Director, Institute for Biological Research, Johns Hopkins University, Baltimore, Md. Representing the National Academy of Sciences, W. H. Howell, *Vice-President and Chairman of Executive Committee*, National Research Council, Washington, D. C.; R. A. Millikan, Director, Norman Bridge Laboratory of Physics, California Institute of Technology, Pasadena, Calif.; David White, Senior Geologist, U. S. Geological Survey. Representing National Research Council, Vernon Kellogg, Secretary Emeritus, National Research Council, Washington, D. C.; C. G. Abbot, Secretary, Smithsonian Institution, Washington, D. C.; Harrison E. Howe, Editor of Industrial and Engineering Chemistry, Representing Journalistic Profession, John H. Finley, Associate Editor, New York Times; Mark Sullivan, Writer, Washington, D. C.; Marlen E. Pew, Editor of Editor and Publisher, New York City. Representing E. W. Scripps Estate, Harry L. Smithton, *Treasurer*, Cincinnati, Ohio; Robert P. Scripps, Scripps-Howard Newspapers, West Chester, Ohio; Thomas L. Sidlo, Cleveland, Ohio.

## Staff of Science Service

Managing Editor, Watson Davis; Staff writers: Frank Thone, Emily C. Davis, Jane Stafford, Marjorie Van de Water, J. W. Young; Librarian, Minna Gill; Sales and Advertising Manager, Hallie Jenkins.

Copyright 1933, by Science Service, Inc. Reproduction of any portion of the SCIENCE NEWS LETTER is strictly prohibited since it is distributed for personal, school, club or library use only. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service, details and samples of which will gladly be sent on request.

Members of the American Association for the Advancement of Science have the privilege of subscribing to the SCIENCE NEWS LETTER at the reduced price of \$3 per year. Application for this privilege should be accompanied by privilege card obtained from the Permanent Secretary, A. A. A. S., Smithsonian Institution Building, Washington, D. C.

Publication Office, 1930 Clifton Ave., Baltimore, Md., Editorial and Executive Office, Constitution Ave. at 21st St., N. W., Washington, D. C.

Address all communications to Washington, D. C. Cable address: Scienserve, Washington.

Entered as second class matter October 1, 1926, at the post-office at Baltimore, Md., under the act of March 3, 1879. Established in mimeographed form March 13, 1922. Title registered as trade-mark, U. S. and Canadian Patent Offices.

## DO YOU KNOW?

The height of a British fog will be measured by a small, instrument-carrying balloon.

Chicago felt a temperature drop of 61 degrees in 24 hours, one memorable November day in 1911.

Chemists in this country have been experimenting with hazelnut oil, which is said to be a popular salad oil in Switzerland.

Strips of a recently developed non-deteriorating rubber road are to be laid in Penang, Straits Settlements, for service tests.

A sailboat of fabricated iron plates, welded together, is being built, with the idea of producing a boat proof against the boring attacks of shipworms.

Infra-red photography is found to have medical uses: for example varicose veins unnoticed by the eye have shown up in infra-red photographs.

Cornell University reports that merely by rearranging furniture 8,860 households in New York State have increased home comfort without spending money.

Fruit growers in the Hudson Valley of New York sold no less than 99 varieties of apples in 1931, a survey shows.

The atmosphere in the city of Lyons, France, is distinctly darker today than forty years ago, says a scientist who compared atmospheric records.

Grand Forks County, North Dakota, figures that by spending \$13,000 for poison grasshopper bait last year, the county saved \$400,000 worth of crops.

The fastest transportation of plants on record is claimed for a shipment of rhododendron cuttings which went from England to California in eight days.

It costs about a cent a mile more to operate the average automobile on a gravel road than on smooth pavement, and one cent more on earth road than on gravel.

Since liver treatment has turned pernicious anemia into a curable disease, some research workers say that it is hard to find enough anemia patients to provide data for further studies.

## WITH THE SCIENCES THIS WEEK

## AERONAUTICS—METEOROLOGY

What is a "line storm"? p. 222.

## ARCHAEOLOGY

Why were "ostraka" important to ancient Greeks? p. 212.

## ASTRONOMY

How long was the meteor of March 24 visible? p. 221.

Why will not the Pons-Winnecke comet come as close to the earth on its present visit as in past years? p. 216.

## BACTERIOLOGY

What races used bacteria instead of yeast in beer-making? p. 221.

## CHEMISTRY

What acid is vitamin C? p. 212. *The Vitamins*—H. C. Sherman and S. L. Smith—Chem. Cat. Co., 1931, \$6.

What vitamin does brewer's yeast yield? p. 216.

## DENTISTRY—PHYSICS

Can dental fillings give you an electric shock? p. 223.

## ETHNOLOGY

Are the Jews a race? p. 217.

## GENERAL SCIENCE

Why do scientists acclaim the appointment of Dr. Briggs to the directorship of the U. S. Bureau of Standards? p. 211. *The Bureau of Standards*—Brookings Institution, 1925, \$2. Service Monograph.

## GEOLOGY

Why is Carbon Mountain famous? p. 211.

## HYGIENE

What is the best posture exercise? p. 217.

## MEDICINE

Do rats develop cancer more readily than guinea pigs? p. 211.

## METEOROLOGY

What extreme of cooling power has been reached on Mt. Washington? p. 223.

## PHARMACOLOGY

How does a new method test for veronal sleeping potions? p. 212.

## PHYSICS

What is learned about isotopes with the mass spectrograph? p. 213.

## PSYCHOLOGY

Do large or small families make for emotionally better adjusted couples? p. 215.

How long does it take infants to learn to reach almost as well as adults? p. 212.

How may children be stimulated most in their school work? p. 216.

## ZOOLOGY

How can a hibernating animal be aroused? p. 222.

What are crinoids? p. 220. *A Naturalist at the Seashore*—William Crowder—Century, 1928, \$10.

*These curiosity-arousing questions show at a glance the wide field of scientific activity from which this week's news comes. Book references in italic type are not sources of information of the article, but are references for further reading. Books cited can be supplied by Book Dept., Science News Letter, at publishers' prices, prepaid in U. S.*

MEDICINE

# Cancer Follows Injection Of Germ From Proved Case

Conventional Ideas Attacked as Culture From Human Makes Guinea Pig Cancerous at National Health Institute

**D**EVELOPMENT of cancer following the injection of a germ or micro-organism has been announced by the U. S. Public Health Service's National Institute of Health.

The discovery was made by Drs. T. J. Glover and J. L. Engle who have been working at the Institute, although they are not attached to the regular government staff nor to the U. S. Public Health Service.

They have succeeded in producing typical, unmistakable cancer in a guinea pig. This cancer followed the injection of a culture of a micro-organism or germ isolated from the tissues of a proved case of cancer of the human breast.

Medical scientists here are frankly excited by the discovery. They realize that it attacks the prevalent opinion that cancer is not a germ disease.

Application of the new discovery to the treatment of human cancer is far in the future, but the experiments of Drs. Glover and Engle promise to blaze a new line of cancer research that appears very hopeful.

"It promises to open a valuable field for further research," commented Dr. George W. McCoy, director of the Institute.

Drs. Glover and Engle have also found that cancer in rats follows injection of their culture of germs from human cancerous tissue. But rats develop cancer so very easily that this was not considered convincing evidence that the germ or culture actually could cause cancer. The production of cancer in guinea pigs which, so far as anyone knows or can find out, do not readily develop it, is considered much more of a feat and more convincing that the germ culture of Drs. Glover and Engle is cancer-producing.

The cancer produced in the guinea pig has all the characteristic appearance of cancer when examined by the unaided eye and under the microscope. Furthermore it spread, producing cancer in other parts of the body, thus fulfilling another of the criteria for the

diagnosis of the growth as cancer.

The germ itself is what scientists call a spore-bearer. It was isolated on special media from the tissues of the human cancer.

In the report made public, only one case of cancer in the guinea pig is described. The diagnosis of cancer in this case was confirmed by a pathologist of the National Institute of Health, and the foremost staff bacteriologist is now checking the bacteriological side of the work.

Dr. Glover started his investigations several years ago in New York. For the last three years, the work has been carried on by himself and Dr. Engle at the National Institute of Health where the director and staff scientists could follow and check various steps of the research.

In their report made public recently they do not claim specifically to have discovered the cause of cancer, but state with characteristic scientific reserve:

"It is the purpose of this report to place on record the production of metastatic malignancy in one of a group of guinea pigs inoculated with a culture containing a spore-bearing micro-organism which (Turn to Page 220)

GEOLOGY

## Internal Fires Make Mountain Move

**I**NTERNAL FIRES of Carbon Mountain, near Durango, Colo., are the cause of the "moving mountain" phenomenon now attracting attention, scientists of the Colorado Museum of Natural History at Denver explain. The explosion under this mountain producing additional avalanches of rock, heavy smoke and fumes, indicates fire in the underlying deposits. The original movements are doubtless traceable, in the opinion of the scientists, to expansion and pressure imposed through the heat of underlying fires.

Science News Letter, April 8, 1933



DR. LYMAN J. BRIGGS

GENERAL SCIENCE

## New Bureau of Standards Head Chosen From Ranks

**P**RESIDENT ROOSEVELT'S nomination of Dr. Lyman J. Briggs to be director of the National Bureau of Standards of the Department of Commerce is received with acclaim in scientific Washington as evidence that there will be no playing of politics in the operation of the scientific research bureaus of the government under the Roosevelt administration.

The elevation of Dr. Briggs to succeed Dr. G. K. Burgess who died last year is a promotion from the ranks of scientists who labor at the Bureau of Standards for Uncle Sam. He has been acting director since Dr. Burgess' death and President Hoover nominated him to the directorship but his nomination, with all others made to the lame-duck Senate by Hoover, died because of inaction by the Senate. President Roosevelt, by renewing Dr. Briggs' nomination, has followed the tradition that directors of this great government testing, research and standardization laboratory are eminent scientists who have won research laurels in the organization. Dr. Briggs is the third director in the history of the Bureau of Standards. The late Dr. S. W. Stratton who resigned to become president of the Massachusetts Institute of Technology was director at the formation of the institution shortly after the turn of the century. Dr. Burgess was chief of the



bureau's metallurgical division before being made director.

Dr. Briggs is a leading physicist and former chief of the bureau's division of mechanics and sound. He is the co-inventor, with Dr. Paul R. Heyl, of the earth inductor compass that is now widely used on aircraft. This invention was recognized by the award of the

Magellan medal. During the World War, Dr. Briggs developed with J. F. Hayford a gyroscopic instrument for maintaining an artificial horizon below decks as an aid in directing gun-fire from battleships. These instruments are now installed on many battleships of the Navy.

*Science News Letter, April 8, 1933*

#### PSYCHOLOGY

## Chimpanzees Use Earphones In Tests of Hearing

**T**ESTING the hearing of chimpanzees was the rather novel task of a psychologist, described by J. H. Elder, of Yale University, to the meeting of the New York Branch of the American Psychological Association.

Chimpanzees are no harder to test accurately than are human children, Mr. Elder reported. His method was to train the apes to press a key when the signal was given and not to press it when they heard nothing. Standard earphones were used and the apes were then allowed to listen to sounds of known frequency from an audiometer.

The frequencies heard by the chimpanzees are within the range audible to human beings, although several of the apes could hear frequencies lower than those heard by the average human.

Mr. Elder believes his method of testing would work well with very young children.

### Reaching Quickly Learned

By the time he is 60 weeks old, an infant has built up a skill in reaching for objects which compares very favorably with that of an adult, Dr. H. M. Halverson, of Yale University, told the meeting of the Psychological Association.

This skill has been built up, too, with the initial handicap of having no repertoire of already learned movements on which to build. The first steps toward building of the reaching skill by the very young infant are reflexes or simple automatic movements without direction from the mind. The next stage is the period of slowly acquired voluntary movements which range from crude groping to direct reaching.

In the final stage the movements become largely automatic again. Practice has made the reaching a more or less

fixed habit on the part of the reacher.

Progress of infants in reaching has been studied by Dr. Halverson through the use of motion pictures taken of a group of babies at regular four-week intervals.

*Science News Letter, April 8, 1933*

#### PHARMACOLOGY

## New Sleeping Potion Test May Aid in Poison Cases

**A** NEW TEST for some of the modern sleeping potions, which may aid in solving the mysteries of murders and suicides, has been developed by Dr. Theodore Koppányi, Dr. William S. Murphy and Stephen Krop of Georgetown University School of Medicine, Washington.

The sleeping potions in question are of the type known to the public as veronal and known to scientists as barbital and derivatives of barbituric acid. Only a few chemical tests for them have previously been described, and these were not very satisfactory or reliable.

In the new procedure, the development of a blue color indicates the presence of barbital or other barbituric acid compounds. The amount of barbital in the blood or other body fluid being tested is determined by comparing the depth of this blue color with that of a solution containing a known amount of barbital. By this method the Georgetown investigators were able to detect the presence of barbital in body fluids or organs in such small amounts as five hundredths of a milligram, or about the amount that would cover the head of a pin, in one cubic centimeter of the fluid being tested.

*Science News Letter, April 8, 1933*

#### CHEMISTRY

## Standard Proposed For Scurvy-Preventing Vitamin

**A**N INTERNATIONAL standard of the scurvy-preventing power of hexuronic acid, which is now almost positively known to be vitamin C, is proposed by T. W. Birch, Leslie J. Harris and S. N. Ray of the Nutritional Laboratory at Cambridge.

In a communication to the scientific publication, *Nature*, they suggest as the international standard an amount of orange juice equal to about four drops or 1 cubic centimeter, which is equivalent to about one-half a milligram of the hexuronic acid.

If this international standard is adopted, as has been done for other vitamins, a physician can prescribe a certain number of units of vitamin C or a certain amount by weight of hexuronic acid. Likewise, research scientists will have a better measure for the vitamin C activity of foods.

Little doubt remains that vitamin C and hexuronic acid are the same, the Cambridge investigators reported. They also described a rapid micro-chemical method by which the chemist in the laboratory can estimate the amount of hexuronic acid or vitamin C in foods. It will thus be possible to test for vitamin C nearly as easily as the fat content of milk is determined by the Babcock test, for instance. Ordinarily the determination of the vitamin content of foods must be done by the tedious process of feeding experiments.

*Science News Letter, April 8, 1933*

#### ARCHAEOLOGY

## Relics of Famous Greeks Coming to Light in Athens

**A** RCHAEOLOGISTS excavating the famous Agora in Athens are finding this market place a veritable mine of relics associated with the great men of Greece, and further discoveries are expected.

Describing the most recent finds, Prof. T. Leslie Shear of Princeton, field director, says in a report:

"These discoveries prove that this area, where Athenian leaders planned and wrought events which have moulded history, will continually yield relics associated with those men and their deeds."

The Athenian Agora is being excavated by the American School of



Arts and Archaeology

**VOTE AGAINST ARISTIDES**

*This pottery ballot was cast by an Athenian to record his vote in the balloting that banished Aristides the Just from Athens.*

Classical Studies at Athens, with cooperation of Greek archaeologists.

The archaeologists have unearthed and held in their hands four ostraka, ballots made of pottery scraps, marked with the name of Aristides. These are relics of the voting that banished Aristides the Just from Athens, a story familiar to every school child through the anecdote of Aristides being asked to write his own name on a ballot for an illiterate stranger.

Ostraka from other voting days have also been found, including one historic relic bearing the name of Hipparchos. He was the first of the influential Pisistratid family against whom the law of ostracism was invoked. He was banished by popular vote in January 487 B.C. Eleven clay ballots with names important in Greek history were found in one rectangular rock shaft.

In public buildings in the Agora were deposited stone tablets bearing permanent copies of laws, treaties, and official decrees. The archaeological expedition has unearthed some of these documents of Greek government, some bearing important information in Greek history and chronology. It is inevitable that many more important public documents will be brought to light, as excavations progress, Prof. Shear hopefully says.

*Science News Letter, April 8, 1933*

## PHYSICS

# Energy Turned Into Mass For First Time in History

## Atom Disintegration Experiments Confirm Einstein's Theory of Mass-Energy Equivalence

**F**OR THE FIRST TIME in all history, physicists seem to have discovered a case of energy turning into mass, that is, non-material "push and shove" being converted into something material that can be weighed, as it were.

Dr. Kenneth T. Bainbridge, fellow of the Franklin Institute's Bartol Research Foundation and authority on the masses of atoms, explains that when lithium is bombarded with the heart of a helium atom, energy may be converted into mass.

The experiments were made by Mme. Irene Curie-Joliot, daughter of the discoverers of radium, her husband, Dr. F. Joliot, and P. Savel at the Institut de Radium in Paris last year.

When a lithium atom of mass seven is hit by and captures an alpha particle, or helium atom heart, there is strong indication of the transfer of kinetic energy of the impinging alpha particle into what the physicists call "inertial mass." This creates an atom of boron of mass ten. This isotope of boron is one of the experimental products of lithium's disintegration.

The mass of lithium seven, measured in 1925 by J. L. Costa, was essential in determining the apparent change of energy into mass.

**Caution Suggested**

"Change of energy into inertial mass must be viewed with caution," Dr. Bainbridge said in a Franklin Institute lecture, "but available experimental data makes the suggestion the most plausible of four possible explanations."

While this is the first apparent case of energy being converted into mass, many cases of the changing of mass into energy are known. The transforming of mass of atoms into heat and light is a favorite mechanism for explaining how the sun and stars keep shining for billions upon billions of years.

The scientific value of disintegration and other nuclear experiments far sur-

passes the highly speculative economic values of release of energy from the atom, in Dr. Bainbridge's opinion. Following in the footsteps of Dr. F. W. Aston, the British physicist, who developed the mass-spectrograph to separate chemically identical isotopes and deal with them individually, Dr. Bainbridge has carried on mass-spectrograph studies at the Bartol Research Foundation. He has studied the isotopes of helium, lithium, chlorine, selenium, bromine, cadmium, caesium, zinc, germanium and he has measured the masses of the light and heavy helium isotopes and of beryllium.

**Spectrograph Reveals Types**

"The spectrograph permits the investigator to determine what nuclear types exist," Dr. Bainbridge explained. "It is possible to determine the relative abundance of the isotopes of specific elements and so indirectly the chemical atomic weights and finally to make measurements of the masses of atoms to an accuracy of one part in 30,000. These measurements are important in connection with studies of the disintegration of atomic nuclei.

"The results of atomic mass measurements in cooperation with disintegration experiments furnish an experimental proof of the equivalence of mass and energy deduced theoretically by Einstein. The best example of this is given by the experiments of Cockcroft and Walton on the disintegration of the lithium seven nucleus by the capture of an incident proton resulting in the release of two helium nuclei with a combined energy of about 17,000,000 electron volts, which energy must be the result of a transformation of mass into energy."

*Science News Letter, April 8, 1933*

Whether water is hard may be tested by adding a little soap solution to a sample of the water in a small bottle and shaking it; if an insoluble, sticky, curd-like substance forms, the water is hard, but if it lathers well, it is soft.

PSYCHOLOGY

# Wives Are Most Neurotic

## The Biggest "Worries" of Wives and Husbands, College Boys and Girls, Are Revealed in a Study by a Psychologist

By MARJORIE VAN de WATER

**D**OES the distant roll of approaching thunder send involuntary shivers of fright down your spine? Does an "instinctive" fear make you avoid the touch of metal objects during an electric storm? Does it send you flying about the house to shut out drafts, disconnect electric appliances, perhaps even to hide your head under a feather pillow?

Such a neurotic fear of lightning is a decidedly feminine affliction and one which particularly characterizes married women, it was found by Dr. Raymond Royce Willoughby, of Clark University, when he recently asked a group of married persons and a group of college students to fill out a questionnaire sometimes used by psychiatrists to test for neurotic traits.

Married persons are more neurotic than college students, he discovered.

Wives are more neurotic than husbands.

But husbands have their own ways of displaying a certain amount of emotional instability, too. If you are one who likes to laugh at the frailer sex for timidity in the face of an electric storm, just ask yourself this question "At a reception, do you feel reluctant to meet the most important persons present?" As many as 74 per cent. of the husbands questioned are nervous in this sort of situation. They would much rather dodge out the side door without the punch and cake than be dragged up to pump the hand of the lion of the party. The wives probably think that silly, too.

Men and women, student groups and married groups differed so decidedly and consistently on the particular brand of nervousness affecting them, that Dr. Willoughby found he could single out certain questions as "student" items, others as "married" items, or "male" or "female" items.

"Are you interested in meeting a lot of different kinds of people?"

This is a "male and married" item. Husbands are particularly diffident in

this respect. But wives are less enthusiastic over getting acquainted with strangers than are male college students. It does not worry many college girls.

The importance of this finding is evident when you consider that it is the husbands who most need to get out and meet people. The fact that the typical social climber of fiction is a woman may be justified by this little fact of psychology.

### "Does Criticism Hurt?"

"Can you stand criticism without feeling hurt?"

This is a "married" item, but the difference between husband and wife is not great. What of it there is in the favor of the husband this time. Girl students, however, show up better than do the boys.

Other questions on which the married couples fall down are the following: "Do you like to be with other people a great deal?" and "Were your parents happily married?"

But here is a "student" item:

"Are you troubled by the idea that people are watching you on the street?" Answers to this question revealed a strong difference between married couples and the students, the latter being by far the most likely to be nervous in this regard.

"Do you think people have made quite a lot of fun of you?"

"Do you think you are usually unlucky?"

Such questions bring out typical worries of the college student.

And here are the things which trouble the ladies—whether they be married or single—housewives or students:

"Are you often frightened in the middle of the night?"

"Are you frightened by lightning?"

"Does it make you uneasy to have to cross a wide street or open square?"

Some of the questions included in the list brought out an unusual number of "neurotic" answers from some of the groups, Dr. Willoughby found, and

these tell a story of the particular emotional tensions faced by these persons.

As many as 68 per cent. of the wives report that they are easily moved to tears. And 67 per cent. suffer from stage fright. Among the men students 60 per cent. have stage fright, 59 per cent. daydream frequently, and 55 per cent. worry and are depressed because of poor marks. Of the girl students, 67 per cent. are troubled by things they have said on the spur of the moment and later regretted. Reports from 61 per cent. show that they are kept awake tossing on their pillows by persistent ideas which keep running through their heads.

This does not mean, of course, that all these men and women would be classed as "neurotics" by any physician. Just as there is some good in the worst of us and some bad in the best, so also there may be some tendency to "nerves" in even the most placid and tranquil of individuals.

The questionnaire used by Dr. Willoughby contains a great number of questions. Probably no one would fail to give the "neurotic" answer to at least a few of them. Yet that type of answer to the great majority would indicate a need for medical attention.

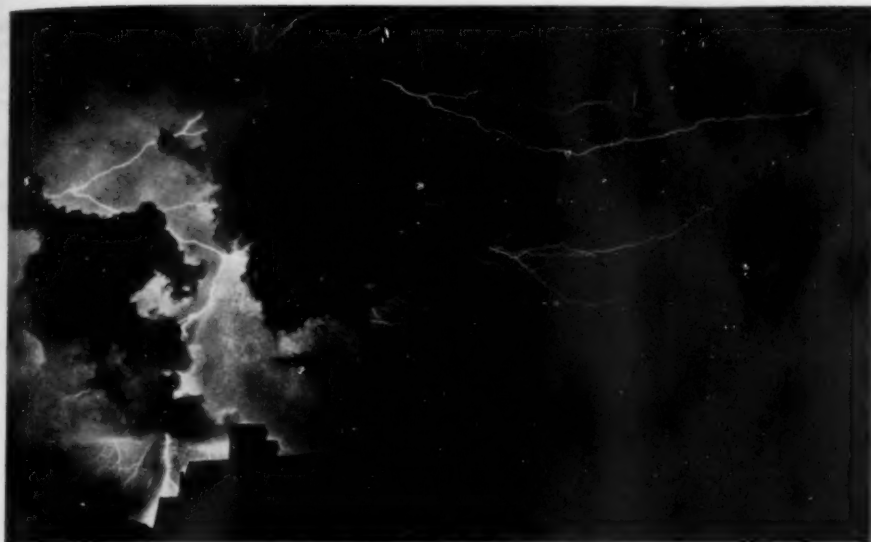
If you search your own mind, you will probably find a number of unreasoning fears such as are included in Dr. Willoughby's list. Perhaps you have an uneasy feeling every time you go out that you may have left the gas stove burning and must go back to look. Perhaps it is an unfounded dread of walking over manhole covers in the pavement. Perhaps you dislike crossing wide streets, or walking down narrow alleys. Or going out at night, or staying alone at home.

### Life's Little Dreads

Normal persons may be conscious of one or a number of such dreads, but are not hindered by them in going about their ordinary business. With truly neurotic individuals, these little fears grow and develop until they assume the proportions of obsessions, and disrupt life's routine until it is centered about the fears.

If you are one who has the gas-stove-burning or the electric-iron-running fear, you may even turn back from the street





### WOULD THIS FRIGHTEN YOU?

*Would you be scared if your home were the center of the storm pictured here? Wives are more afraid of lightning than are their husbands. Girl students fear it more than their male classmates.*

to reassure yourself that all is well. Or you may go so far as to telephone from your office to your home to have someone look into the matter for you even though you may really know that you have turned it off as you customarily do. But once you have secured the necessary reassurance, your mind is then at rest.

The neurotic individual must return again and again and still has no peace of mind.

Or in these days of antiseptic treatment of wounds, you may have developed a dread of infection. Every time you cut yourself, or whenever you see any one else receive a bump or scratch, you must see to it that the wound is properly sterilized. The neurotic person having the same dread would be kept busy all day long scrubbing and sterilizing and disinfecting to remove germs and possible although improbable sources of infection.

"The investigation has been largely exploratory," Dr. Willoughby says of his research, "and on the basis of the results so far found the opinion may be ventured that extremely interesting and significant problems might be uncovered and studied in this field."

Particularly he suggests the interest in studying the relationship between neuroticism and the duration of marriage, age, and size of family.

Results already obtained indicate that couples having three or more children are emotionally better adjusted than

those with smaller families. Dr. Willoughby is careful to point out, however, that it is possible that a reverse statement of the relation might be more correct—it may be that the better adjusted couples are more likely to have the larger families.

Another striking fact which is suggested by the preliminary data obtained by Dr. Willoughby is a calming effect upon the nerves of husbands brought about by the arrival of the first child, and a reverse effect of the same event on the wife.

College students of both sexes seem to be less self-centered and happier in relation to their environment than do the married couples of the same educational and social level studied. The latter, however, appear to have dropped out some of the inner tensions of their students days as they grew older.

### Marriage Taken Seriously

At first thought, this finding will surprise those who have been led by modern theories of psychology to believe that neuroticism has its origin in repressions of the sex desires. Married women in general, however, despite the prevalence of divorce, probably take marriage vows very seriously even when the husband is most incompatible and when emotional adjustment is impossible. Tension in such a case is likely to be considerably greater than it is among a group of young college students who, in these days, have attained or appro-

priated a considerable measure of freedom from sex taboos.

If you are married, you may have noticed some tendencies toward neuroticism in your wife or husband. If so, beware of using this fact as a weapon in a marital spat, for the data from Dr. Willoughby's research have made it a two-edged weapon.

By having married couples fill out the questionnaire for spouse as well as for themselves, he found that the ability to see neurotic traits in one's wife or husband is associated with neuroticism in oneself. And that is particularly true when the neurotic traits are falsely ascribed to the partner in marriage. Women are more discerning than men in sizing up the other person, however.

There is also a real relationship, although it is not very great, between actual neuroticism in one of the pair and neuroticism in the other. It would seem that wives are most likely to be neurotic. But if they are, then they most likely think that the husband is a bit that way, too.

And perhaps he is!

This article was edited from manuscript prepared by Science Service for use in illustrated newspaper magazines. Copyright, 1933, by EveryWeek Magazine and Science Service.

Science News Letter, April 8, 1933

### CHEMISTRY

## Chemical Society's Prize Given for Work on Atoms

THE AWARD of the American Chemical Society's thousand-dollar Langmuir prize to Dr. Frank Harold Spedding, 30, of the University of California was made in recognition of his researches on the differing behavior of atoms at ordinary temperatures and at very low temperatures.

His experiments were conducted at temperatures ranging all the way from that of an ordinary room down to the point where liquid hydrogen "boils" into its gaseous state, which is 252.7 Centigrade degrees below freezing point. In an atmosphere of such extreme cold, the behavior of atoms discharged from various substances is quite different from what it is under ordinary circumstances, and a study of the light rays they give off gives information on the composition of matter.

The Langmuir prize cannot be given to any chemist more than 31 years of age, the object of this limitation being to encourage younger men.

Science News Letter, April 8, 1933

## ASTRONOMY

**Pons-Winnecke Comet Sighted on Return to Sun**

**T**HE FAMOUS periodic Pons-Winnecke comet has returned for another visit to the vicinity of the earth. From the Hamburg Observatory, Germany, the astronomer Wachmann sighted it on March 24 for the first time since its 1927 visit.

It is still faint and visible only in large telescopes, and is located in the constellation of Ophiuchus, the serpent holder, which is in the early morning eastern sky.

The comet is not expected to provide the astronomical entertainment that it offered in 1921 and 1927. In 1927 it was first seen at Yerkes Observatory of the University of Chicago and came within 3,500,000 miles of the earth, only  $14\frac{1}{2}$  times as far away as the moon. Because Pons-Winnecke was affected by the planet Jupiter on its present journey round its orbit, the time between its visits to the earth is lengthening and its closest approach to the sun will not be as close as it has been in the past.

The comet was discovered by a French astronomer, Pons, in 1819, lost and then rediscovered by a German, Winnecke, in 1858. It has been seen about every six years since then, except on two of its returns when it was missed.

On July 1, 1908, the earth passed through the track of this comet and night clouds appeared so white and luminous that people were able to read small-typed print indoors at 10:30 p. m., without artificial light. This phenomenon was due to the scattering of sunlight by the fine dust of the comet.

In 1927 it was discovered that Pons-Winnecke comet has the smallest nucleus or body that has ever been observed in any comet. It is not more than two or three miles in diameter.

*Science News Letter, April 8, 1933*

## PHYSIOLOGY

**Liver Studied Chemically In Health and Disease**

**H**OW THE hemoglobin-producing factors of the human liver are affected by various diseases was reported to the American Chemical Society by Dr. G. H. Whipple of the University of Rochester School of Medicine. Dr. Whipple was one of the pioneers whose investigations led to the liver treatment

for pernicious anemia, in which disease the hemoglobin content of the blood is somewhat reduced.

Acute infections reduce the store of these potent hemoglobin-producing factors in the human liver somewhat, Dr. Whipple found. On the other hand, chronic intoxications had very little effect.

In cirrhosis or inflammation of the liver there was a marked reduction in the amount of the hemoglobin-producing factors. Pernicious anemia showed very high values for these factors. Secondary anemia due to loss of blood showed low normal values, but even long standing severe anemia will not seriously deplete this store of hemoglobin-producing factors in the liver, Dr. Whipple asserted.

*Science News Letter, April 8, 1933*

## PSYCHOLOGY

**Rivalry and Reward Speed Accomplishment in School**

**I**F A CHILD is behind in his school work it is just as likely to be because he is acting from wrong motives as that he lacks ability, Dr. Douglas Fryer, of New York University, said.

Dr. Fryer described a study of 100 children, of whom it was found that only about a third were really trying to learn their lessons. Some were afraid. Some were trying to disturb their classmates who were learning. But those who really tried to learn progressed twice as rapidly as the others of approximately equal intelligence.

"A reward incentive will cause 12-year-old children to do arithmetic 54 per cent. faster than their usual pace," Dr. Fryer said. "A rivalry incentive will cause the same children to do this work 47 per cent. faster. Both reward and rivalry incentives applied together will cause an increase of 65 per cent. in accomplishment.

"For children to work for their class or gang in order to beat another class or gang, is not so strong an incentive as trying to beat other individuals. In other words we work harder for ourselves than we do for others.

"But children will work for their class in school much harder than they do with the bare incentive to learn their lessons.

"Blame or reproof incentives wear out quicker than praise and encouragement. Over a long period of time praise will act as the best incentive."

*Science News Letter, April 8, 1933*

**IN SCIENCE**

## AERONAUTICS

**Leningrad Scientists Plan Stratosphere Ascent**

**A** SPECIAL BALLOON now under construction in Leningrad will be used by Soviet scientists in an attempt to set a new altitude record by penetrating into the stratosphere, in order to study electric and magnetic phenomena, cosmic rays and solar energy in the upper reaches of the atmosphere.

The closed passenger car, which will be attached to the balloon, will have walls ten millimeters thick. It is being constructed of a specially strong non-magnetic alloy which has been perfected by a group of specialists working under the guidance of Engineer Vasienko.

*Science News Letter, April 8, 1933*

## CHEMISTRY

**Crystals of Vitamin B<sub>1</sub> Obtained by Acid Process**

**V**ITAMIN B<sub>1</sub>, preventive of the Oriental disease beri-beri and other nerve disorders, has been obtained in crystals by Dr. Atherton Seidell and Dr. M. I. Smith of the U. S. National Institute of Health. This achievement, important because it makes the vitamin available in pure form for chemical study, was announced at the meeting of the American Chemical Society.

Dr. Seidell and Dr. Smith obtained a concentrate of vitamin B<sub>1</sub> from brewers' yeast by processes already known. This they treated with picronic acid, precipitating out substances of no vitamin value. The liquid left over, when evaporated, yielded a partially crystalline deposit, which after further purification gave them a quantity of prismatic crystals.

These crystals appear to be the vitamin in pure form. Rats suffering from a deficiency of vitamin B<sub>1</sub> were cured with as little as fifteen thousandths of a milligram—about as much as you could pick up on the point of a pin.

*Science News Letter, April 8, 1933*



# THE FIELDS

## HYGIENE

### Standing Straight Found Best Posture Exercise

**S**TRAIGHTENING up into correct posture many times a day is the best exercise for good posture, much better than daily dozens or other gymnastics, the Missouri State Medical Association has concluded.

According to the modern theory, poor posture is not the result of weak muscles, as formerly held, but the result of acquired improper muscle habits. It follows that trying to correct poor posture by daily and hourly gymnastics to strengthen the muscles is wrong. The way to do it is to correct the faulty muscle habits by assuming the proper posture many times during the day.

"Only in this way," comments the editor of the Association's journal, "do we achieve the correct posture of the body to foster full vigor and health, prevent waste of energy and inculcate confidence and assurance."

*Science News Letter, April 8, 1933*

## ETHNOLOGY

### Jews a Mixed People Partly Nordic in Origin

**T**HE JEWS, subject to such violent opposition by the Hitlerites and members of the so-called Nordic movement in Germany, are not, properly speaking, a race. They are a people of mixed racial origin and may even trace part of their ancestry to the fair Nordics. It is no more correct to speak of the "Jewish race" than it would be to refer to the "French race" or "German race."

The Jewish people were originally a Semitic people who even in very early times mixed with Amorites, Hittites, and Philistines; their so-called "Jewish" nose being acquired from the Hittites, according to a British authority on anthropology, Dr. A. C. Hadron, of Cambridge University.

From the Amorites, modern Jews derive their claim to Nordic descent.

The Amorites were a fair people.

The Jews of Germany, and of northern and eastern Europe generally, are by no means purely of the old Palestinian stock, mixed though even that was. They represent a dispersal of the old stock northward and westward by way of the Black Sea and the river valleys that slope towards it. They represent also a vigorous and successful missionary effort on the part of Judaism at about the beginning of the Christian era, which brought into the fold of Abraham considerable numbers of aliens, mostly Slavic, around the Black Sea coasts.

It is perhaps the bitterest piece of irony in the whole tragic situation today in Germany that Hitler, leader of the "Nordics," is himself a non-Nordic, and that the Jews who are being hazed by his partisans have a strong strain of his own "Alpine" blood in their veins.

*Science News Letter, April 8, 1933*

## PHYSICS

### Scientists to Hear Music By Three-Line Transmission

**W**ITH THE Philadelphia symphony orchestra playing in Philadelphia, and with Leopold Stokowski and the audience miles away in a great hall in Washington, the National Academy of Sciences and guests on April 27 will hear a unique symphony concert.

This symphonic program will be a novel supplement to the annual spring meeting of the National Academy.

Engineers of the American Telephone and Telegraph Company will play as important a part in the symphony as Stokowski and his musicians. Three telephone lines will connect the Washington hall where Stokowski and the audience are located with the Philadelphia hall where the musicians perform. Stokowski will be able to control the qualities of the music heard by the audience in a manner that would be impossible if the orchestra were playing directly to them. The multiple telephone lines will allow the transmission of overtones and music qualities lacking in ordinary long distance telephone transmission.

Two days prior to the demonstration, Dr. F. B. Jewett, vice-president of the American Telephone and Telegraph Company, will explain the principles and development of long-distance sound transmission and reproduction.

*Science News Letter, April 8, 1933*

## PHYSICS

### New Use for Electric Eyes Is Measuring X-Rays

**E**LECTRIC EYES that open doors, operate switches, measure light and do a host of other automatic services for science and industry, are now being initiated into a new job of measuring X-rays. Prof. Paul R. Gleason, Colgate University physicist, has found that non-vacuum type of photoelectric cells can be used to measure X-ray radiation from tubes operating up to at least 200,000 volts.

Two cells, properly compensated by filters, measured X-rays in agreement with the standard ionization chamber usually used to within 10 per cent. for long waves but failed by about 25 per cent. at shorter wavelengths. Fifteen seconds were needed for the photocells to get into action when recording X-rays while less than a second lag occurred when light was being measured.

Prof. Gleason is hopeful that photonic cells can be developed into practical X-ray measuring devices.

Photocells of the non-vacuum type are made in various ways. Some of these types, known technically as "barrier-layer" cells, consist of a thin layer of copper on cuprous oxide, while others are made of a layer of selenium on iron. They have the advantage of being more rugged than the vacuum tube types.

*Science News Letter, April 8, 1933*

## PHYSIOLOGY

### Vitamin A in Milk Depends on Hay Cow Gets

**H**OW MUCH vitamin A there is in milk, and in the butter made from the cream thereof, depends to a considerable extent on the kind of hay the cow gets. So reported Dr. E. B. Meigs, A. M. Hartman and H. T. Converse, of the U. S. Bureau of Dairy Industry, before the meeting of the American Chemical Society.

Dr. Meigs and his associates found milk and butter produced on a basis of good alfalfa hay to be definitely richer in this essential vitamin than similar products based on a poor grade of timothy hay. High-grade alfalfa fed to dairy cows is reflected later in a rich natural yellow in their butter, indicative of a high vitamin A content.

*Science News Letter, April 8, 1933*

CHEMISTRY

# Molybdenum and Tungsten

## "A Classic of Science"

Two Elements of Group VI Were Investigated by Scheele, Swedish Apothecary and Pioneer in Chemical Analysis

THE COLLECTED PAPERS OF CARL WILHELM SCHEELLE, Translated from the Swedish and German Originals by Leonard Dobbin. London: G. Bell & Sons, Ltd., 1931. The following are exact reprints of extracts from this publication.

### Molybdenum

Experiments with Lead-Ore: Molybdaena. Kongl. Vetenskaps Academiens Handlingar. 39 (1778).

DO NOT mean the ordinary lead-ore that is met with in apothecaries' shops, for this is very different from that concerning which I now wish to communicate my experiments to the Royal Academy. I mean here that which in Cronstedt's Mineralogy is called *Molybdaena membranacea nitens*, and with which Quist and others probably made their experiments. The kinds I had occasion to submit to tests were got in different places but they were all found to be of the same nature and composed of the same constituents.

1. (a) I first wished to know how molybdaena behaves in the wet way. For this, it was necessary to get it very finely pulverised. Now since it does not permit of being ground to fine powder by itself, on account of its flexible lamellae, some fragments of vitriolated tartar [potassium sulphate] were also placed in the glass mortar occasionally, when it was at last transformed to a fine powder, which was sifted. Hot water was afterwards poured upon the powder and it was stirred. Molybdaena then sank to the bottom and the solution was poured off. This was repeated several times until no more vitriolated tartar was found in the decanted water, when the powder was dried.

2. I both digested and boiled this mineral with all known acids, but only found two amongst them which have an action upon it, namely, the acids of

arsenic and of nitre. The acid of arsenic does not attack molybdaena before all the water has evaporated. If the heat is then increased a little, arsenic rises into the neck of the retort and, at the end, yellow arsenic is sublimed. Volatile acid of sulphur is obtained in the receiver.

Two parts of fuming acid of nitre were poured upon one part of powder of molybdaena. Scarcely had the mixture in the retort become lukewarm before everything rose together into the receiver with strong heat and dark-red fume. I do not doubt but that the mixture would have taken fire if it had been in somewhat greater quantity. Accordingly, I found it better to use diluted acid of nitre.

3. Six ounces of diluted acid of nitre were poured upon an ounce and a half of pulverised molybdaena. This was placed on a sand-bath, in a glass retort with a luted-on receiver. During digestion the acid would not act, but when the menstruum began to boil, red elastic vapours arose with strong frothing (therefore the retort ought also to be sufficiently large): the acid was abstracted to dryness. The residuum now had a grey colour. The same quantity of diluted acid of nitre was again poured upon it, which frothed with it just as before. This also was distilled off until the remainder was dry, which was now whiter than on the preceding occasion. The same quantity of acid of nitre was again poured upon this and was similarly abstracted. The same operation was repeated for the fourth and fifth times: then at last a chalk-white powder remained. This residuum was edulcorated with hot water until all acidity was gone, and was dried. It weighed six and a half drachms: I shall call it *terra molybdaenae*. The colourless clear edulcorating water was evaporated till half an ounce of it remained behind: it then acquired a fine blue colour, was thick, and contained a little iron. For the rest, it was mostly acid

of vitriol. When the acid was diluted with water, the colour disappeared. Fixed and volatile caustic alkali do not attack molybdaena in the wet way. . . .

7. Earth of molybdaena is of an acid nature. Its solution reddens litmus; soap solution becomes white, and liver of sulphur is precipitated. (b) The solution has also some action on metals. When it is boiled with filings of all base metals, the solution at last becomes bluish. (c) If very little alkali of tartar [potassium carbonate] is added, the earth is dissolved in greater quantity in water, and after cooling crystallises in small confused crystals. This small quantity of alkali brings it about that the earth is not volatilised in the open fire. (d) The solution, while it is still hot, shows its acid property more strongly. It reddens litmus more; it effervesces with chalk, white magnesite, and earth of alum, whence intermediate salts arise which are very difficultly dissolved in water. (e) It precipitates silver, quicksilver, and lead dissolved in acid of nitre; also lead dissolved in acid of salt. These precipitates are reduced upon charcoal, when the melted earth sinks into the charcoal. The other metals are not precipitated, neither is corrosive mercury. (f) The earth of heavy spar, dissolved in acid of salt or of nitre, is likewise precipitated. This precipitate is not regenerated heavy spar [barium sulphate], because it is dissolved by cold water, a property which does not belong to regenerated heavy spar. The solutions of other kinds of earth are not precipitated. (g) The solution also drives out the aerial acid from fixed

How do we know when a star is coming straight toward us?

SIR WILLIAM HUGGINS

found out by applying the Doppler-Fizeau Principle to stellar spectroscopy. He will tell about it in

THE NEXT CLASSIC OF SCIENCE



KARL WILHELM SCHEELÉ  
1742-1786

and volatile alkalis; with these it yields neutral salts which precipitate all metallic solutions. Gold, corrosive sublimate, zinc, and manganese are precipitated white; iron and tin in acid of salt, brown; cobalt, rose-red; copper, blue; alum and lime solutions, white. If the sal ammoniac composed of the volatile alkali and the earth of molybdaena is distilled, the earth parts with its volatile alkali at a moderate heat and remains in the retort as a grey powder. . . .

13. After I had now analysed molybdaena and carried out my experiments with its variety of earth, it still remained to be able to recombine this mineral from its proximate constituents. It is known that molybdaena contains sulphur, and my experiments testify the same thing. One part of very finely ground earth of molybdaena was mixed with three parts of sulphur. The mixture was heated on the open fire in a glass retort with luted-on receiver. The retort was so placed at the beginning that the sulphur which rose up into the neck could run back again, but at the

end the sulphur was driven off entirely. The receiver, besides the sulphur, was filled with a suffocating smell of volatile spirit of sulphur. The residuum in the retort resembled a black powder which, rubbed between the fingers, begrimed them with a shining black colour, and for the remainder had the same behaviour in all experiments as natural molybdaena.

Hence we see here a variety of earth which was probably unknown up to the present and which we may call, with reason, acid of molybdaena, since it has all the properties of an acid. But I think I already hear it said: It might be some metallic earth combined with a still unknown acid, or *vice versa*. I leave such and similar views for what they may be worth, so long as there is wanting here convincing proof based upon clear experiments. And although it resembles a metallic earth in certain circumstances, still I believe with confidence that molybdaena consists of an acid mineralised with sulphur.

#### Tungsten

*The Constituents of Tungsten.*  
Kongl. Vetenskaps Academiens  
Nya Handlingar. 2 (1781).

The constituents of this variety of stone seem probably to be still unknown to chemists. Cronstedt enumerates it amongst the ferruginous varieties of stone, under the name of *Ferrum calciforme, terra quadam incognita intime mixtum*. That which I used for my experiments is pearl-coloured and taken from the iron mine of Bitsberg; and as I made many experiments upon it and have ascertained its constituents, I take the liberty of presenting the following to the Royal Academy:

1. (a) In the fire, tungsten does not undergo any perceptible change, neither has glass of borax any special action upon it; (b) but microcosmic salt gives with it, before the blowpipe, a sea-green coloured glass. When such a glass bead is kept in fusion before the outermost tip of a candle flame the colour gradually disappears; a very little nitre also takes away the colour instantly, but it appears again when the blue candle flame is driven upon it. Hence the phlogiston of the flame is the cause of the production of the colour. (c) One part of tungsten finely ground in a glass mortar was mixed with four parts of alkali of tartar [potassium carbonate] and placed in the fire in an iron crucible. When the mixture was

melted, it was poured out upon an iron plate and dissolved in twelve parts of boiling water. Several hours afterwards the ley was poured off from a quantity of white powder which had settled on the bottom. (d) This powder wasedulcorated and acid of nitre was poured upon it until no more effervescence was observed, by which means a great part of it was dissolved. (e) The undissolved powder was dried and again mixed with four parts of alkali of tartar and was melted as on the previous occasion; the mass was dissolved again in water and the powder which remained behind was dissolved in acid of nitre; when only a very little grey powder remained over. (f) The ley (letter c) was saturated with acid of nitre; the mixture then became thick with a white powder, which was washed with cold water and dried. (g) The solution with acid of nitre (letter d) was precipitated with alkali of tartar, when a white precipitate was formed which was dried. . . .

3. (a) The solutions thus prepared with acid of nitre were mixed together and some drops of phlogisticated alkali [potassium ferrocyanide] were added, whereupon about two grains of Prussian blue separated: (b) The mixture was afterwards saturated with caustic volatile alkali [ammonia], but as no precipitate appeared, some solution of alkali of tartar was added; a white powder then separated which weighed, after it was washed and dried, two scruples and five grains. This earth was found to be pure aerated lime; the kind of earth which was obtained according to § 1, letter (g), is also the same. (c) The extracts obtained with volatile alkali were precipitated with acid of nitre; the precipitate was washed with cold water and dried. This precipitate is exactly the same as that mentioned in § 1, letter (f). (d) It is of an acid nature, because it is soluble in water, although about twenty parts of boiling water are required for one part of the precipitate, and it colours litmus tincture red; likewise it has an acid taste. . . .

6. When acid of tungsten is calcined in a crucible, it loses its property of being dissolved afterwards by water. That the acid is inclined to attract phlogiston is seen from the blue colour which it shows in fluxes. . . . Solution of liver of sulphur was precipitated green by our acid, but phlogisticated alkali, white. This latter precipitate is soluble in water. When some drops of acid of salt are mixed with the solution of



this acid in water, and spread upon polished iron, zinc, or even tin, or when these metals are placed in the acid, the acid acquires a fine blue colour.

7. Since the acid of molybdaena also assumes a blue colour from the last-named metals, it is easy to suppose that the acid of tungsten is nothing else than acid of molybdaena. But since in other experiments it behaves quite differently, our acid must also be of a different nature; because (1) the acid of molybdaena is volatile and melts in the fire, which does not occur with acid of tungsten. (2) The first-named acid has a stronger affinity for phlogiston, which is seen from its union with sulphur, and the change it undergoes on calcination with oil. (3) *Calx molybdaenata* does not become yellow with acid of nitre and is dissolved by it quite easily. With tungsten the contrary occurs. (4) *Terra ponderosa molybdaenata* is soluble in water, but not the same variety of earth united with our acid; and (5) acid of molybdaena has a weaker attraction for lime than our acid, because when *calx molybdaenata* is digested with a solution of the previously mentioned sal ammoniac tungsten is again obtained. The iron which is obtained from some sorts of tungsten ought to be regarded as accidentally pertaining to it.

*Science News Letter, April 8, 1933*

## From Page 211

was isolated on special media from the tissue of a microscopically proven carcinoma of the human breast."

Further points to be determined are whether the micro-organism they have described causes the cancer, or whether it is caused by some virus or other germ present in the culture or by some toxin or other substance produced by the bacteria of the culture. It is possible that this culture is not the cause of all types of cancer, but of one group of them. Efforts to develop a serum, either curative or protective, will be a logical outcome of this research.

Investigation of the infectiousness of a type of cancer produced by bacteria as this one was in the guinea pig will also have to be developed.

One of the two physicians making the discovery is from New York while the second is from Philadelphia. They had worked under private research grants for about ten years before bringing their experiments to the National Institute of Health for critical testing.

The story of the development of one kind of cancer in a guinea pig is re-

vealed by daily records in the notebook of Dr. Engle.

These details are given in the Public Health Reports of the U. S. Public Health Service, in which the discovery is being announced to the world.

On Nov. 5, 1932, an adult female guinea pig, a discarded breeder, was inoculated in the mammary region with the germ culture obtained from a proved case of cancer of the human breast.

On Nov. 8, 1932, a condition termed infiltration was observed, by which the investigators could tell that the tissues were being affected.

On Dec. 22, 1932, isolated nodular areas developed in the region.

On Jan. 9, 1933, the nodules were seen to be enlarged and the inguinal glands were affected.

On Feb. 20, 1933, still further increase in size of the tumor and nodules was observed.

On Feb. 24, 1933, the animal was growing weaker.

On Feb. 28, 1933, the animal was very weak and was chloroformed.

Examination post mortem showed tumors in the breast region, inguinal region, kidneys, omentum and within the chest.

The pathologist's diagnosis was: Malignant adenoma with metastasis into the lymph nodes, omentum and kidneys. Commenting on what he found in the animal's body, he said:

"New growth has apparently arisen

## ZOOLOGY

# Life of Geologic Past Harvested From Sea Bottom

**H**ARVESTS of "sea lilies," and other strange creatures of the perpetually dark ocean depths have been brought home to the Smithsonian Institution by a recently-returned expedition to the waters just north of Puerto Rico, where the deepest part of the North Atlantic Ocean is to be found.

These strange creatures, though called sea lilies, are really animals, relatives of the starfishes. Like them, they have a number of radiating arms, but the arms are branched, and the creatures are attached "bottom side up" to long stalks which anchor them per-

manently to the bottom. Sea lilies, or crinoids as they are also called, were once among the dominators of life on this planet, many millions of years ago. Now, although they are still numerous in the ocean depths, their leadership has been taken away from them by more advanced and active animals.

There are no plants in the great depths at which the sea lilies grow, for no light ever penetrates to those abysses, and plants cannot grow without light. The whole world of life there consists of animals preying upon other animals, with supplies of carrion plant

life in the breast tissue. In the invasion and destruction of muscular tissue and in the production of distinct metastasis it fulfills two of the criteria of malignancy."

Upsetting to conventional ideas about cancer is this announcement from the National Institute of Health stating that Drs. Glover and Engle have succeeded in producing cancer in a guinea pig through the use of germ cultures from a human breast cancer case.

This may prove to be the most important news of today or even this year. It is certain that the claims of these two physicians, not government scientists but using Uncle Sam's facilities with the kindly cooperation of the Public Health Service scientists, will meet with opposition from other cancer researchers and practitioners. It is important that such experiments be checked and rechecked by independent experiments. But from such research beginnings have come the conquest of other dread diseases of the human race.

As yet there is no hope for cancer cure or treatment resulting from this work by Drs. Glover and Engle. Cancer patients will only waste time and money by bothering them. Probably there are several different kinds of cancer. The Glover-Engle discovery may mean that one kind of cancer is germborne and possibly communicable. But it is much too early to draw conclusions. We can only hope for fruitful results from the beginnings made.

*Science News Letter, April 8, 1933*

## SPEED— AND ITS SIGNIFICANCE IN CHEMISTRY

by

Dr. Hugh S. Taylor

Professor of Physical Chemistry, Yale University

This address will be given Friday, April 14, at 11:45 A. M. over stations of the Columbia Broadcasting System. Each week a prominent scientist speaks over the Columbia System under the auspices of Science Service.

## BACTERIOLOGY

# Bacteria Replace Yeast To Make Ancient Sacred Drink

**B**EEER made by the fermentive action of a special bacterial culture instead of the customary yeast, and drunk bacteria and all, is an excellent remedy for disorders of the digestive organs as well as a palatable drink. So states Prof. Paul Lindner of the Berlin Agricultural College, who made the discovery in the course of an endeavor to determine the identity of "soma," the sacred drink of the ancient Persians and Indians. Prof. Lindner's preliminary report is given in the German scientific weekly, *Forschungen und Fortschritte*.

"Soma" had long been supposed to be merely ordinary beer, with the addition of some kind of plant, not now identifiable with any certainty. But the health-giving properties of the brew are so lauded in the ancient literature that Prof. Lindner suspected that the well-being induced by it was more than the ordinary pleasant delusion of a successful *Bierabend*.

He had for many years been familiar with the Mexican drink "aguamiel," made from the juice of the century plant, and sometimes called "milk of the green cow" because it was drunk by the Mexicans while it was still white with its active fermentation. He had discovered that the fermentive organism in this drink is not a wild yeast but a bacterium, which he called *Termobacterium mobile*, or for convenience simply Tm. The same organism has been found in other fermented drinks produced in the tropics, and where it is present it predominates to the exclusion of yeasts.

Prof. Lindner suspected that it was the bacteria rather than the beverages they produced that brought about the excellent digestive and assimilative health of the drinkers. To test this theory, he centrifuged out about a tablespoonful of the organisms from some fermented liquid and swallowed them "straight." They did have a most beneficial effect, he reports.

He then undertook scientifically controlled brewing, using Tm bacteria instead of yeast. He found that the products of such fermentation were pure ethyl alcohol with a very little lactic acid, but no fusel oil, supposed to be the prime cause of the "Katzenjammer"

following indiscreet indulgence in yeast-fermented beverages. For one thing, the bacteria apparently cannot ferment malt sugar, but only glucose, and hence produce a beer of quite low alcoholic content, but high food value.

He induced a commercial brewery in Sweden and one in Vienna to produce bacteria-fermented beer on a moderately large scale, and with the cooperation of Dr. Leo Kaps of the Wilhelmina Hospital in Vienna tried it on a large number of patients. When given with the bacterial cloudiness still in it, the beer induced excellent conditions in the digestive tract. The same beer filtered, however, was merely an agreeable drink and had no therapeutic value.

According to the ancient Oriental literature, "soma" was so good that even the gods eagerly drank it out of the bowl of the moon, which was regularly refilled for them every month. The god of "soma" was the father of all the other gods.

Science News Letter, April 8, 1933

## ASTRONOMY

## Meteor Observed By Scientist on Train

**F**ROM A SPEEDING railroad train, Dr. John Strong of the California Institute of Technology recorded observations of the unusual meteor of Friday, March 24, that lighted three states just before sunrise.

"The meteor appeared like a rocket," Dr. Strong told Science Service, "and it seemed to come up from the earth. Its trajectory was slightly arched and it was visible about five seconds. The first light was more intense than daylight and it lighted up three states.

"The meteor seemed to wobble, leaving a luminous tail about two degrees long. The meteor and tail appeared like a rocket of burning magnesium with red streamers of granular material. At the end of the trajectory overhead the meteor forked and turned red and then was no longer visible.

"The cloud of smoke about a fourth of a degree wide was luminous as if a searchlight were (Turn to Page 222)

and animal material drifting down from the sunnier water strata above. Because the water is so cold in the depths, putrefaction goes on very slowly; the dead bodies are in permanent cold storage, waiting for submarine scavenger-beasts to come and eat.

Among the beasts that prey upon living things, down there in the everlasting dark, is a species of shrimp with folding razors for claws. It probably uses them for traps. Then there is a very thin eel with a dagger-like beak, and mollusks with shells like cork-screws.

The expedition which brought back this collection of strange abyssal animal life was sent out by the Smithsonian Institution under the leadership of Dr. Paul Bartsch, curator of mollusks. It had the use of the motor yacht *Caroline*, owned by Eldridge R. Johnson of Philadelphia, and specially equipped with apparatus for deep-sea work. It is the intention of Mr. Johnson and the Institution to cooperate in future expeditions for the complete study of physical and chemical conditions of the water and of plant and animal life of all the deep places of the North Atlantic.

Science News Letter, April 8, 1933

About 10,000,000 trees were planted last year, in connection with George Washington bicentennial celebrations.

Half a million ounces of gold used by American dentists through the year can be diverted into currency reserves, the dentists using platinum alloys instead, says a professor of dentistry at New York University.

AERONAUTICS—METEOROLOGY

# Weather Apparently Cause Of Destruction of the Akron

UNUSUALLY violent vertical currents of air, such as are commonly found along the "wind shift line" of a storm area, are suspected of having caused the "Akron" disaster by scientists of the U. S. Weather Bureau. C. L. Mitchell, principal meteorologist, informed Science Service that such a line did extend out over the sea near Barnegat at the time of the "Akron's" last voyage, and that thunderstorms, the usual accompaniment of a "line storm," had been observed late Monday night.

Dr. J. W. Humphreys, the Weather Bureau's leading physicist, explained that these vertical air currents are caused by the encounter of masses of warm and cold air. Since there is a marked difference in the specific gravity of such air masses, the warmer air tends to rise and the cold to flow to the bottom, thereby setting up "boiling" currents very similar to those which can be seen in a kettle of water being heated on a stove.

Such vertical currents, he said, may leap upward or plunge downward as much as twenty thousand feet, so that even if the "Akron" had been flying at an apparently safe height when one of them caught her, she might have been whirled upward and demoralized, or forced downward and caught by the waves. While a modern rigid airship can defy ordinary vertical gusts with impunity, these vertical winds are so powerful that propellers and rudders are of no avail against them.

Vertical winds often have very sharp

boundaries, and a pair of them, one blowing up and the other down, may exist within a few feet of each other. The "line storm" that destroyed the "Akron's" ill-fated predecessor, the "Shenandoah," apparently caught that airship in such a pair of oppositely flowing vertical air currents.

*Science News Letter, April 8, 1933*

## From Page 221

trained on it. The smoke column broke into four or five segments which rotated ten degrees and coalesced to form a striated cloud. The highest segment remained isolated. The cloud was brightly illuminated with fringes appearing alternately rich blue, then white. The isolated segment emitted brown light. The meteor was first noticed at 5:05 a. m., when the train was at Springer, New Mexico. The sun rose at about 6 a. m., when the train I was on was at Wagon Mound. At 6:15 a. m., the cloud was still visible."

*Science News Letter, April 8, 1933*

On the lofty ice cap of Greenland the temperature may fall as low as 130 degrees below zero.

The Peruvian congress has taken steps to make Cuzco, capital of the ancient Incas, the archaeological capital of South America, and has transferred the Peruvian National Museum from Lima to Cuzco.

ZOOLOGY

## NATURE RAMBLINGS

by Frank Thone



### Sleepers Awaken

WHEN BEARS come out of their caves and hollow trees in the mountains, and ground squirrels, woodchucks and frogs emerge from their underground hiding-places in our own more prosaic fields and waysides, they are like the plants in responding to the sun as both alarm clock and ultimate source of energy for the new season.

Animals that hibernate are sent into their long winter sleep by the warning of the retreating sun and frosty nights in the fall. And when they come out in spring it is largely a result of their being warmed up again.

For it is a curious fact that hibernating mammals become temporarily cold-blooded. They become almost as cold-blooded as snakes and frogs, their body temperature dropping far below that of the normal bodily heat of warm-blooded animals, to a few degrees above freezing-point. In that state they become limp lumps of fur, breathing only a few times a minute, and are nearly insensible to stimuli that would ordinarily awaken them from a sound normal sleep.

Dr. George E. Johnson of the Kansas State Agricultural College made experiments on hibernating striped ground squirrels. They could be handled, even shaken or pricked with pins, but beyond breathing a trifle more rapidly made no response. Taken into a warm room the breathing rate increased, and the heartbeat, which had been imperceptible even with a stethoscope, asserted itself and gradually reached normal rate. At the same time the body temperature went up, and when it approached normal mammalian warmth a typical animal roused, stood on its feet, and even showed some signs of fight.

(Next Page)

## CONVENIENCE COUPON

for New or Renewal Subscription to Science News Letter

Send this coupon to Washington while you are thinking of it.

Science News Letter,  
21st and Constitution Avenue,  
Washington, D. C.

Please ☐ start ☐ renew my subscription to SCIENCE NEWS LETTER. I am enclosing remittance as checked: ☐ 2 years, \$7 ☐ 1 year, \$5

Name .....  
Street .....  
Address .....  
City and .....  
State .....

If this subscription is a renewal, check here . . . .



This "death-seeming sleep" of hibernation appears to be simply a means of conserving energy, of bridging over a period of food scarcity at a time when food would be most needed if body temperature were to be maintained at its usual level. For a great deal of fuel is needed in winter, as all of us non-hibernating animals are aware, just to keep ourselves warm, not to mention getting our usual work done. But if we could bank our bodily fires, letting them burn low as the bears and chipmunks do, we could live for weeks on our fat that would ordinarily be exhausted in days and leave us starving. Thus the round belly of a bear and the round bulb of a lily are closely parallel in their function, except that the bear uses his reserve supply of food during the winter itself, and the flower waits until spring to eat up its store.

*Science News Letter, April 8, 1933*

#### DENTISTRY—PHYSICS

### Metals in Teeth May Generate Electricity

WHEN TEETH are repaired or replaced with different kinds of metals, electricity may be generated in the mouth just as in the cell of an electric battery. Cases in which this electricity caused pain and sores in the mouth were reported to the American Medical Association by Dr. Everett S. Lain, professor of dermatology and radiology at the University of Oklahoma School of Medicine.

Human saliva is a good electrolyte, Dr. Lain has found from repeated experiments. Thus every mouth in which there are plates, bridges, crowns or fillings of dissimilar metals becomes a complete galvanic battery.

If all the crowns, amalgam fillings and other dental material in a mouth are made of the same metal, or of metals nearly alike in what the physicists call electromotive force, there is no trouble. Gold and silver and copper, for instance, are not so different in this respect, so that when their ions are dissociated by the saliva, hardly any current is generated.

But the difference between gold and certain other common dental metals, such as aluminum and zinc, or the recently suggested chromium, is quite large. When two such dissimilar metals are used in the same mouth, they may act as the two opposite poles of an electric battery. The current generated is sufficient to cause serious trouble.

Dentists have for many years recognized the possibility of electric shocks and nerve soreness resulting when dissimilar metal dentures happen to come in contact, Dr. Lain pointed out in his report. To avoid such occurrences, they have made a practice of grinding short one of the metallic contacts.

Dr. Lain examined more than 300 mouths which contained dissimilar metallic dentures. Nearly three-fourths of them showed some signs of the electric current action.

*Science News Letter, April 8, 1933*

#### METEOROLOGY

### Mt. Washington Colder Than the Antarctic

See Front Cover

By DR. CHARLES F. BROOKS, Director of Blue Hill Observatory, Harvard University.

IT WAS COLD in Boston on a recent March day. The temperature was about 10 degrees Fahrenheit and the wind some 20 miles an hour. Autos froze up and people suffered in the biting wind. The "cooling power" of the wind was 72 on a scale having its zero for a condition of calm at a temperature of 98.6 degrees Fahrenheit, and a value of 10 at the "comfortable"

temperature of 68, with a slight breeze. So 72 is a high cooling power.

What was the lowest temperature experienced by the Byrd Expedition at Little America? It was 72 degrees below zero, but the weather was calm, so the cooling power was only 57, or even less than Boston's that cold Saturday. But Little America suffered from blizzards, in the worst of which the temperature fell to 58 degrees below zero with a 43 mile an hour wind. That was cold! The cooling power was 190.

Now consider Mt. Washington at its worst, or rather we should say it was probably not at its worst. The same Saturday morning at 8 a. m. a west-north-west wind at 25 below zero was whistling over the summit at 98 miles an hour! And it had been up to 145 miles an hour, according to the anemometer, which, however, may have registered 10 miles too high. Allowing for the lower air density and therefore lesser cooling power of a wind of a certain velocity on the mountain top, we find that the cooling power was 193, or as bad as Little America's coldest blizzard!

Rigor of winter at the summit of Mt. Washington is graphically pictured on the cover of this week's SCIENCE NEWS LETTER. As early as October 15 of last year, when this picture was taken by Harold Orne of Melrose Highlands, Mass., ice and snow had wrought curious shapes upon the rocks, the houses and cog-railroad trestle of the mountain top. The picture shows observers examining instrument mounted on the end of the trestle.

*Science News Letter, April 8, 1933*

## Announcing the SPRING BOOK NUMBER of Science News Letter, April 22, 1933

NEW BOOKS will be the theme of Science News Letter for April 22, just two weeks hence. By means of quotations, reviews, lists and advertisements, this magazine will inform you of what is new and best among science publications. You will enjoy it and want to keep it. Watch for Science News Letter Spring Book Number.

# • First Glances at New Books

## Anthropology

**SOCIAL ANTHROPOLOGY**—Paul Radin—*McGraw-Hill*, 432 p., \$3.50. Among primitive peoples may be found every type of organized society, from democracy to rigid theocracy, Dr. Radin points out. Taking examples from all over the world, he explains seven types of state organization. His interesting method, followed also in later chapters on law, economics, religion, literature, is to use a particular tribe to illustrate the development of each phase of culture.

*Science News Letter*, April 8, 1933

## Economics

**THE CONSUMER**—Walter B. Pitkin—*McGraw-Hill*, 421 p., \$4. Seven years ago Prof. Pitkin launched studies in an effort to learn something accurate about consumers of printed matter, especially of newspapers, magazines and books. This book resulted. He explains that production has become a marvelous technology while consumption remains a no-man's-land. Advertising is a queer cross between a black art and a swindle in his opinion. In lively style he tells how wealth accumulates, describes the web of life, lists the factors limiting volume of consumption, gives the classes of consumers, reports the war between maker and user and then discusses what can be done about it all.

*Science News Letter*, April 8, 1933

## Photography

**MODERN PHOTOGRAPHY, 1932**—Edited by C. G. Holme—*Studio Publications, Inc.*, New York, 128 p., wrappers, \$2.50, cloth, \$3.50. Outstanding specimens of photographic art from all over the world, beautifully reproduced.

*Science News Letter*, April 8, 1933

## Ethnology

**THE MAYAWYAW RITUAL: 1. RICE CULTURE AND RICE RITUAL**—Francis Lambrecht—*Catholic Anthropological Conference*, 167 p., \$2.75. To the Mayawyaw of the Philippines rice is the staff of life and the main wealth. An extensive ritual surrounds the rice cultivation.

*Science News Letter*, April 8, 1933

## Agricultural Economics

**AGRICULTURAL RUSSIA AND THE WHEAT PROBLEM**—Vladimir P. Timoshenko—*Food Research Institute*, 571 p., \$4. Published jointly by the Food Research Institute and the Committee on

Russian Research of the Hoover War Library at Stanford University, this book constitutes the first number of a Grain Economics Series. The author was formerly professor of economics at the Ukrainian University in Prague, so that he brings intimate first-hand knowledge to his problem.

*Science News Letter*, April 8, 1933

## Geology

**THE LOWER YORK-JAMES PENINSULA**—Joseph Kent Roberts—*Virginia Geological Survey*, 58 p., free. The land between the James and York rivers is rich in classic memories of American history. But it has an interest in the longer story of geological development that is at least as great as its significance in human history, and it is around this framework of geological history that the author of this pamphlet has built his account of the region. This brief popular publication should be in the hands of every visitor to the area, no less than the customary accounts of the early Colonial settlements and the stirring events at the close of the American Revolution.

*Science News Letter*, April 8, 1933

## Geography

**NEW ENGLAND'S PROSPECT: 1933**—*American Geographical Society*, 502 p., \$5. In 1634 there was published in London a volume with the same title as this in which William Wood said: "I have laid down the nature of the Country, without any partial respect unto it." This modern inquiry has also proceeded in a detached spirit of scholarly inquiry. The several contributors, each a specialist in his field, tried not to advertise New England nor to glorify it but to see it as it is. Such a volume as this reveals the new service of geography to mankind, and demonstrates that the old idea of geography as a matter of maps alone is antiquated. History, landscapes, industries, food, marketing, community life, immigrant stocks, forests, taxation, fisheries, power utilities, social service and the changing geography of New England are among the topics covered.

*Science News Letter*, April 8, 1933

## Bacteriology

**MICROBIOLOGY OF FOODS**—Fred Wilbur Tanner—*Twin City Printing Co.*, 768 p., \$7.50. The microbes, both desirable and undesirable, found in foods are the subject of this comprehensive and practical textbook by the professor of bacteriology and head of the department at the University of Illinois.

*Science News Letter*, April 8, 1933

## Horticulture

**INDUSTRIAL COOPERATIVE GARDENING**—B. F. Goodrich Co., 20 p., Free. An account of a cooperative gardening project carried out by an industrial firm for the benefit of unemployed men of its own staff, published for the benefit of social workers and of industrialists inclined to do in like manner.

*Science News Letter*, April 8, 1933

## Geology-Engineering

**EARTH OIL**—Gustav Egloff—*Williams and Wilkins*, 158 p., \$1. The director of research of the Universal Oil Products Company tells the story of petroleum, beginning with the antiquity of oil and ending with a survey of the world's oil resources. This is one of the Century of Progress Series.

*Science News Letter*, April 8, 1933

## Physics

**TIME, SPACE AND ATOMS**—Richard T. Cox—*Williams and Wilkins*, 154 p., \$1. One of the Century of Progress series. The new physics and its roots in the old physics are discussed authoritatively and with pleasing clarity.

*Science News Letter*, April 8, 1933

## Forestry

**ELEMENTS OF FOREST MENSURATION**—H. H. Chapman and D. B. Demeritt—*J. B. Lyon, Albany*, 452 p., \$3.50. A complete textbook covering subjects which are a necessary part of the training of every practical forester.

*Science News Letter*, April 8, 1933

## Radio

**THE RADIO AMATEUR'S HANDBOOK**—A. Frederick Collins—*Crowell*, 419 p., \$2. A revised edition.

*Science News Letter*, April 8, 1933

Science News Letter will secure for its subscribers any book or magazine in print, which was published in the United States. Send check or money order to cover regular retail price (\$5 if price is unknown, change to be remitted) and we will pay postage in the U. S. When publications are free, send 10c for handling. Address: Book Dept., Science News Letter, 21st and Constitution Ave., Washington, D. C.